Before the
Federal Communications Commission
Washington, D.C. 20554

In the matter of:	)	
	)	GN Dockets Nos.
SPECTRUM FOR BROADBAND	)	09-47, 51 and 137
NBP Public Notice # 6	)	

Comments of Globecomm Systems Inc.

Globecomm Systems Inc. (GSI)[1] is pleased to provide comments in response to the Commission's Public Notice DA 09-2100, released September 23, 2009.

The Commission having received Comments in response to its development of a National Broadband Plan and other public input from its series of broadband workshops, herein seeks additional fact-based responses from the public regarding the adequacy of spectrum resources to meet the demands for wireless broadband in the near future. The Commission states that it will consider the substance of GN Docket No. 09-157 (Fostering Innovation and Investment in the Wireless Communications Market), FCC 09-66, released August 27, 2009 in the context of the instant proceeding. It is in these regards, and in furtherance of universal broadband service, that GSI comments herein and submits its technical broadband whitepaper to demonstrate how state-of-the-art satellite technology is an effective means to bring broadband where it may not otherwise be feasible or economic.

GSI is a global communications company delivering complete solutions for telecommunications, Internet, and broadcasting services. GSI's customers turn to it because of

[1] GSI, also known as GLOBECOMM, filed Comments with the Commission in GN Docket 09-40 on September 13, 2009 and also in GN Docket 09-51 on June 8, 2009 emphasizing its interest in pursuit of universal broadband service.

its proven ability to reduce customers' time from project conception to cut-over to operations. As such; GSI provides its customers a single, reliable source for engineering, system integration and installation and operational services -- GSI takes total, end-to-end responsibility for making complex solutions work.

In its previous filings with the Commission, GSI undertook to define a universal broadband solution, which among other things, addresses the problem of providing broadband services to unserved and underserved regions of the United States – areas with no or little broadband and with limited or no broadband backhaul connectivity. To this end, GSI's technology team has drafted a technical whitepaper under which broadband and other communications services are supported from a hosted core network by combining satellite and wireless broadband network technologies, with a converged multi-standard core. The result as shown in the whitepaper and as stated in GSI's prior filings with the FCC is that broadband services can be made available anywhere in the United States within a short timeframe and on an affordable basis. Further, the facilities to be deployed by GSI are designed to migrate to and evolve with developing communications standards. No other technologies or communications systems are required to support the introduction and evolution of broadband service to new areas.

Insofar as the Commission in the instant proceedings is concerned with the physical and economic aspects of backhaul, GSI's solution addresses this problem. Thus, GSI will use satellite transmission generally for its backhaul solution where other transport is unavailable or less economic. GSI views the satellite element as one of a number of available-technologies in an IP cloud, which will always use the best means of connectivity to serve unserved or under-served regions. Satellite connectivity, by its unique technological nature -- premised on ready-deployment and distance insensitivity to cost -- will always be available as the foundation of a

universal broadband solution. Specific regions may have available alternate technologies that can be used without any appreciable design change or impact as depicted in its whitepaper. This is because GSI's solution is based on IP; so, any transport technology that supports IP can be used whenever available. As a consequence, when alternative and less-costly technologies are present, GSI will seek to employ them into its model.

GSI's universal broadband solution is premised on a centralized core network, collocated with a satellite teleport to support wireless cellular technologies for the first and last mile needed for local broadband services. This core can support GSM, UMTS, CDMA, and WiMAX (indeed, even possibly MVDDS) services. Further, the core as envisioned by GSI will evolve to LTE and IMS standards allowing it to support all IP based services.

The entirety of GSI's universal broadband service concept in its present iteration is attached hereto as an appendix. However, at the heart of GSI's concept is the availability of adequate and readily available spectrum for local broadband origination and termination.

Thus, GSI agrees with those entities that have made the case that fixed wireless is often the best available technology – in terms of cost and ready-availability – for first and last mile broadband connectivity. Further, GSI agrees with AT&T and Ericcson North America (both referenced in the FCC's Public Notice DA 09-2100) which illuminate how demand for local spectrum for broadband origination and termination outstrip supply. While GSI's broadband universal solution embraces the range of local wireless broadband solutions of today and tomorrow, the availability of adequate local spectrum resources is a concern that must be resolved. Consequently, the Commission should both foster the use and availability of existing licensed local spectrum as well as continue its policies to seek out and re-farm underutilized spectrum for new, local use by broadband service suppliers.

In conclusion, GSI urges the Commission to give its position, supported by its attached technical whitepaper, full consideration as a logical and cost-effective path toward the Commission's ultimate goal of promoting policies that lead as quickly as possible to universal broadband service throughout the United States.

Respectively Submitted,

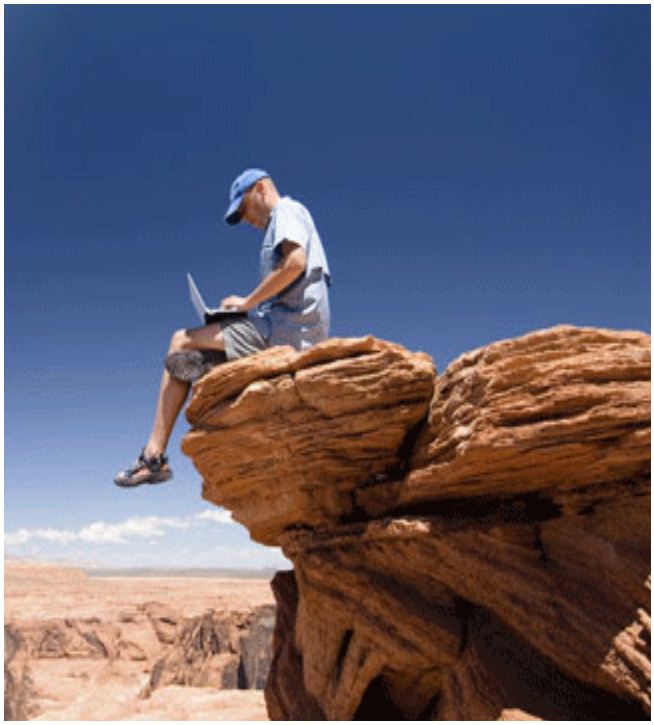
/s/ Paul J. Johnson

Paul J. Johnson, Senior Vice President
Customer Relations and Contracts
Globecomm Systems, Inc.
45 Oser Avenue
Hauppauge, NY 11788-3816

October 23, 2009

Appendix

RURAL BROADBAND SERVICE SOLUTION



Prepared By:

Globecomm Systems Inc.
Hauppauge, New York

September 2009

GLOBECOMM SYSTEMS INC.
ISO 9001 CERTIFIED
CORPORATE HEADQUARTERS: 45 OSER AVENUE • HAUPPAUGE, NY 11788-3816 USA • TEL: +1 631 231-9800 • FAX: + 631 231-1557
E-mail: info@globecommsystems.com • http://www.globecommsystems.com
Offices: Maryland • Hong Kong • Dubai

1.0 EXECUTIVE SUMMARY

Globecomm Systems Inc. (GSI) is pleased to provide this technology proposal overview in response to a requirement for efficient delivery of broadband services in the United States. This paper presents a technical approach and associated service offering for providing cost effective broadband access to un-served or underserved rural communities.

It is important to note that this solution is available today. Through the use of GSI's backhaul technology and hosted services platform, broadband service can be provided to communities at fixed costs irrespective of their location and current access or proximity to existing telecommunications infrastructure.

The service offered is technology flexible meaning it can be offered via a variety of end-user delivery technologies (e.g., 3G cellular, WiFi, and WiMax). This is an advantage for several reasons:

- The service seamlessly integrates with the rest of the worldwide telecommunications grid
- The service uses subscriber units (e.g., handsets) manufactured in high production continually funded by millions of dollars of R&D
- The service is future proof as it is on the same evolution path as mainstream wireless communications

It is shown this service can be offered today for under $90 per subscriber per month, and that this cost will only decrease over time as next generation access technologies (e.g., spot beam satellite service) become available over the next few years.

The balance of this document is organized as follows:

Section 2.0 - Introduction - Introduces the technologies and the hosted services platform (HSP) used in the solution, and also some background on GSI.

Section 3.0 - Technology Solution – A description of the backhaul and last mile delivery technologies used to achieve the service.

Section 4.0 - Conclusion - A summary that illustrates how the technology and service described is an effective solution for rural broadband service.

Section 5.0 - Glossary - Provides a listing of terms and acronyms used in this document.

2.0 INTRODUCTION

This document provides a technical solution and budgetary pricing for hardware and services to engineer and integrate a wireless broadband data service that can be deployed anywhere.

The proposed solution assumes the use of the GSM-based evolution (i.e., UMTS) of mobile wireless technologies to create a local network that delivers data services efficiently where this infrastructure does not exist. Although this document focuses on UMTS, it is noted that the solution is also available with other end-user delivery technologies (i.e., CDMA, WiMax), and that all these technologies will integrate and merge on GSI's hosted services platform, as this core network has been structured and planned to support the evolution of these technologies through LTE and IMS.

Satellite-based IP networking allows these local broadband networks to be supported anywhere in the US. The wireless technologies proposed will be supported by a common core network making it possible to support broadband data and a full range of other telecommunications services independent of the wireless technology used.

The core network and satellite hub are hosted at the GSI Long Island International Teleport in Hauppauge, New York. Currently the core network hosts GSM, UMTS, CDMA and WiMax services. The core will be evolved to support LTE and IMS compliant services as these mature over the next few years. Inter-operational testing for any new applications would be supported by GSI's internal labs co-located at the Long Island Teleport.

2.1 GSI Experience

GSI believes it is uniquely qualified to address rural broadband requirements for a number of reasons both in terms of its capabilities and past experience.

- GSI has implemented similar complex networks providing such services in many regions of the world
- GSI has already worked successfully on past projects with all of the vendors used in this solution and recommended for this network.
- GSI is currently running the core network from its New York headquarters, supporting the services offered in this proposal.
- GSI has application labs and specialized engineering teams to support the evolution of the technology proposed.

GSI has extensive experience in designing, implementing and providing life cycle support for complex networks developed for specific applications. A few examples of other network deployments are:

- An IP satellite network providing voice and data services to over 300 small villages throughout Afghanistan
- An IP-based GSM network for 200 small villages throughout Alaska consisting of over 150 MSC's and making use software defined radio base stations
- Service to 80 UNICEF and 170 other locations mostly in Africa for the United Nations.
- Internet service to over 100 locations in Iraq for US servicemen.
- A hosted 3G CDMA network for an underserved region in Africa

2.2 Company Overview

Globecomm Systems Inc. (GSI) is a global communications company delivering complete solutions for telecommunications, Internet, and broadcasting services. Customers turn to our company because of our proven ability to reduce their time-to-complete; we can provide a single, reliable source for engineering, systems and services; and take total, end-to-end responsibility for making complex solutions work.

Founded in 1994 and publicly traded on the NASDAQ since 1997, our company specializes in turnkey, value-added satellite-based communications infrastructure and space segment services. Our 200,000 square foot facility is dedicated to the system engineering, integration and test of communications systems and networks. We employ approximately three Hundred (300) people with a strong engineering staff covering a broad range of disciplines, including IP, wireless, wireline, and broadcast technologies, as well as satellite technology.

Globecomm Systems Inc., New York

Our Long Island International Teleport (LIIT) provides network services and as such provides the ability to support our customers with not only hardware integration and installation, but with support services. Our Hosted Wireless Core supports a full range of services for GSM, CDMA, and WiMax wireless networks.

Long Island International Teleport

Our facilities in Hauppauge, NY have been certified to the ISO-9001 international quality system standard since December 1997.

Customer satisfaction is as important to us as our quality products. We provide 24X7 phone support through our Network Operations Center (NOC) with customer care representatives offering teleport and Internet protocol engineering expertise. All requests for assistance are logged into our Remedy Trouble Ticketing System for action by the appropriate resources. Our Customer Service Department works closely with the NOC to assure customer satisfaction.

Network Operations Center/ Broadcast Center Facility

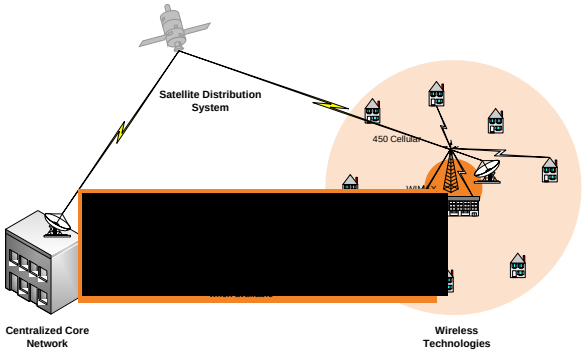
Globecomm selects vendors and subcontractors who are commercially sound and technically competent to provide material and services at a level of quality, price, and delivery appropriate to the contract. Subcontractors are chosen on the basis of their ability to provide materials and services that conform to the requirements of the purchase order, including quality system and quality assurance requirements in accordance with GSI Standard Procedure 1020, Evaluation of Suppliers/ Subcontractors. Subcontractors are qualified in a number of ways, which may include one or more of the following:

- Past relationship history
- On-site survey of the quality system
- ISO 9001 registration
- Product evaluation
- Published listings of qualified manufacturers
- Previously demonstrated capability

3.0 TECHNOLOGY SOLUTION

GSI's solution addresses the problem of providing broadband services to underserved regions with limited or no broadband backhaul connectivity. Broadband and other communications services are supported from a hosted core network by combining satellite and wireless broadband network technologies, with a converged multi-standard core. The result is broadband services that can be available anywhere in the USA and that will migrate with the developing communications standards. No other technologies or communications systems are required to support this service.

Satellite is used as the general backhaul solution. The satellite element can be considered as one of a number of technologies in an IP cloud, which uses the best available connectivity to serve any un-served region. Satellite connectivity will be available for all underserved regions and allows a universal solution, so it is a basis of this proposal. Specific regions may have available alternate technologies that can be used without any appreciable design change or impact. This is because the solution is based on IP so any transport technology that supports IP can be used when available. Costs presented are based on the satellite solution and may be reduced when alternate technologies are available.



The solution uses a centralized core network, collocated with a satellite teleport to support wireless cellular technologies for local broadband services. The core can support GSM, UMTS, CDMA, WiFi and WiMAX services. The core will evolve to LTE and IMS standards allowing it to support all IP based services.

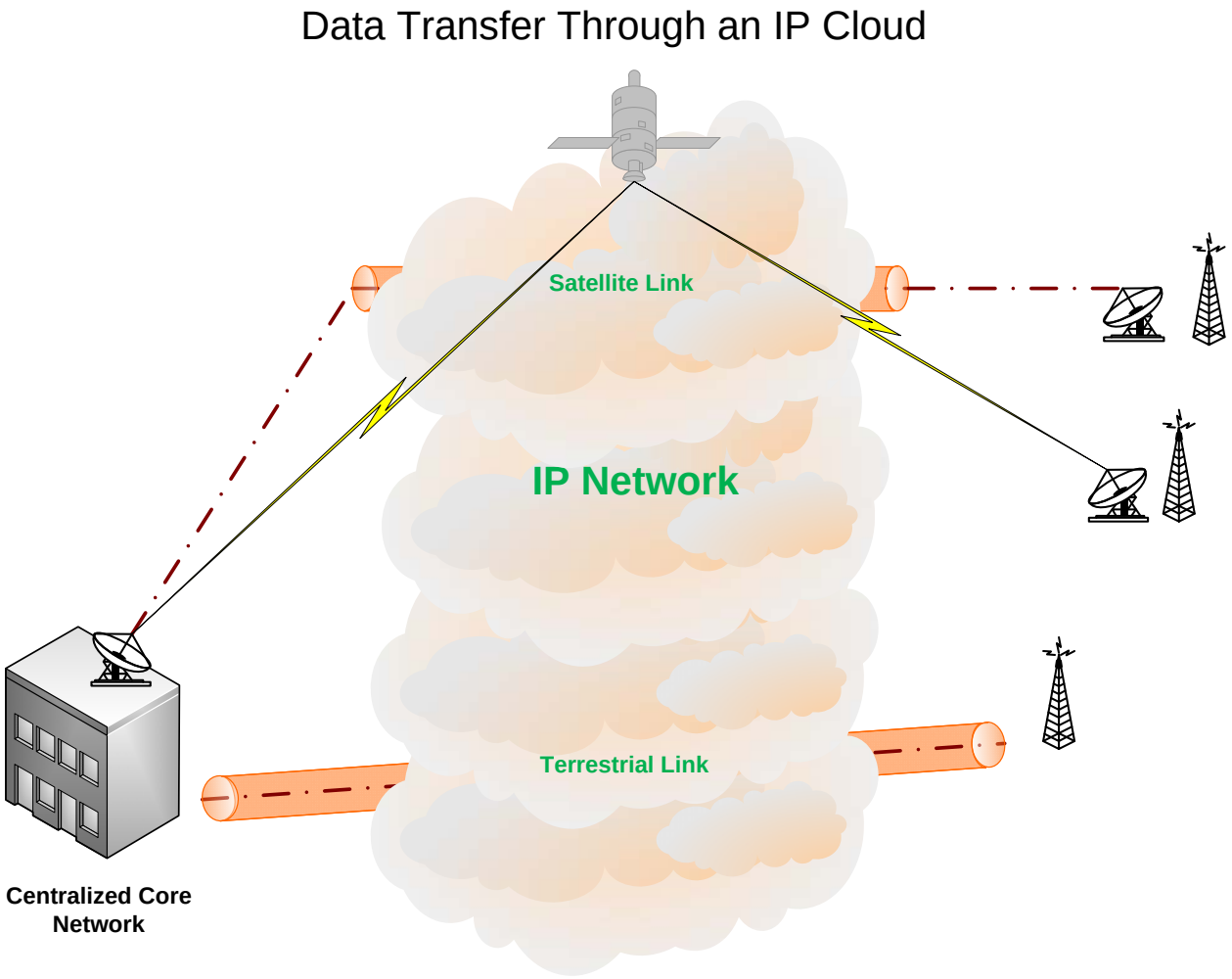
3.1 Core Network

The core network controls all transactions across all wireless technologies. This can be accomplished today from GSI's Hosted Services Platform (HSP) which can support all the wireless technologies used in this proposal. The core provides access to the Internet and the Public Switched Network. It also supports cellular roaming, national and international traffic exchange, and can host postpaid and prepaid billing for data, voice, and video.

3.2 VSAT Technologies

Using the latest demand assigned VSAT technologies allows the creation of an IP cloud that can serve any local wireless network. This is the first step in creating the IP cloud,

however, it need not be the only technology used. .As illustrated below specialized tunnels can be created using alternate technologies when this better serves the offered traffic at any specific location. The IP cloud thus adapts to the applications and can be engineered independently as part of the hosted service.



3.3 Satellite Technologies

Satellites themselves are evolving in a way that makes this service easier to provide. The new generation of satellites will include satellites that will reuse the frequency spectrum in a cellular structure similar to that of the wireless technologies. Using these smaller and more powerful "spot" beams will significantly reduce the cost of bandwidth and equipment used.

3.3.1 VSAT Equipment and Bandwidth

GSI will initiate service at each site with a UMTS Base Station supported by a satellite terminal operating in a demand assigned mode. This modem will

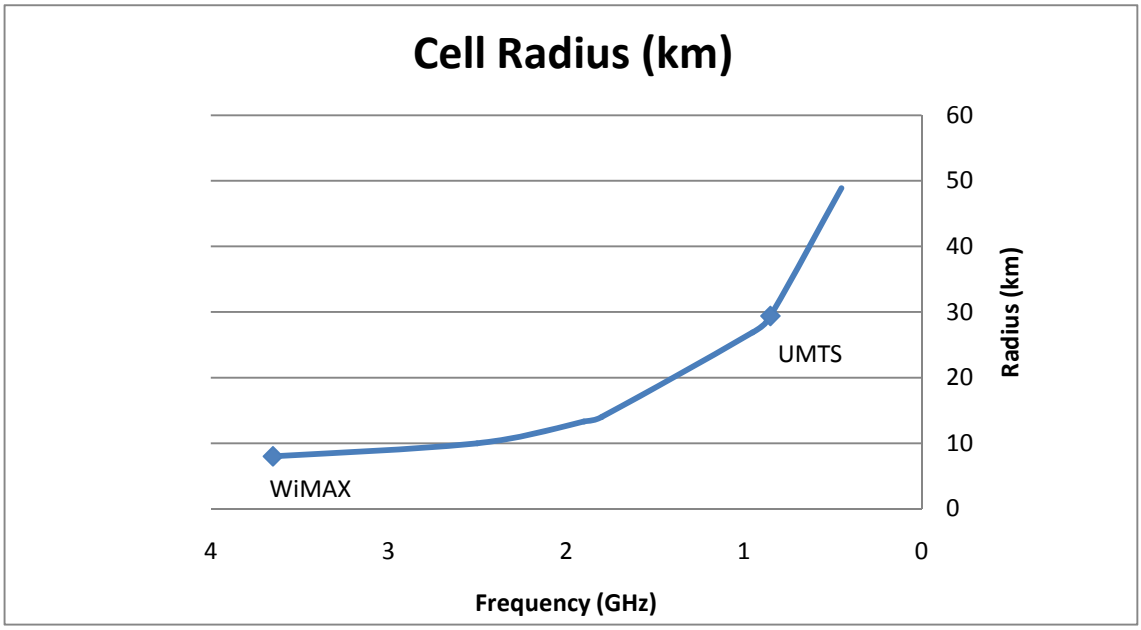
be capable of supporting 10X4 Mbps of traffic, but will only allocate bandwidth when required.

The modem supports two-way IP traffic, and can be operated in a demand assigned mode or a dedicated (SCPC) mode. The mode can be changed by command from the core network. This allows the migration of the site to SCPC service in those cases where traffic characteristics favor this technology. Furthermore the modem features built in application QOS.

3.4 Wireless Technologies

For purposes of this document, the wireless system is based on the evolution of the GSM standard. GSM/EDGE and UMTS capable base stations can migrate to, or be overlaid with, LTE base stations as LTE technology is deployed over the next several years.

The range and throughput of the evolving technologies has a complex relationship to the frequency and power used to transmit the information, and also the range of coverage. Illustrated below is the range as a function of frequency which has been normalized for data throughput and power, to provide a guideline for the deployment of the wireless technologies. These ranges are based on point to multi point architectures and do not use high gain antennas. For fixed locations higher gain antennas can be deployed with all technologies to extend this range.



3.65 GHz is Fixed WIMAX
0.85 GHz is UMTS in the GSM 850 band

3.5 Technology Migration

The current somewhat disparate wireless technologies of GSM, CDMA, WiFi and WiMAX will eventually merge. The figure below illustrates the migration of these three principle wireless technologies. Note that as the GSM path migrates to LTE and IMS the technologies merge. The air interface migrates to COFDM in all technologies, and by standard the air interface becomes independent of the core network allowing new technologies in the air interface to be introduced without changing the core.

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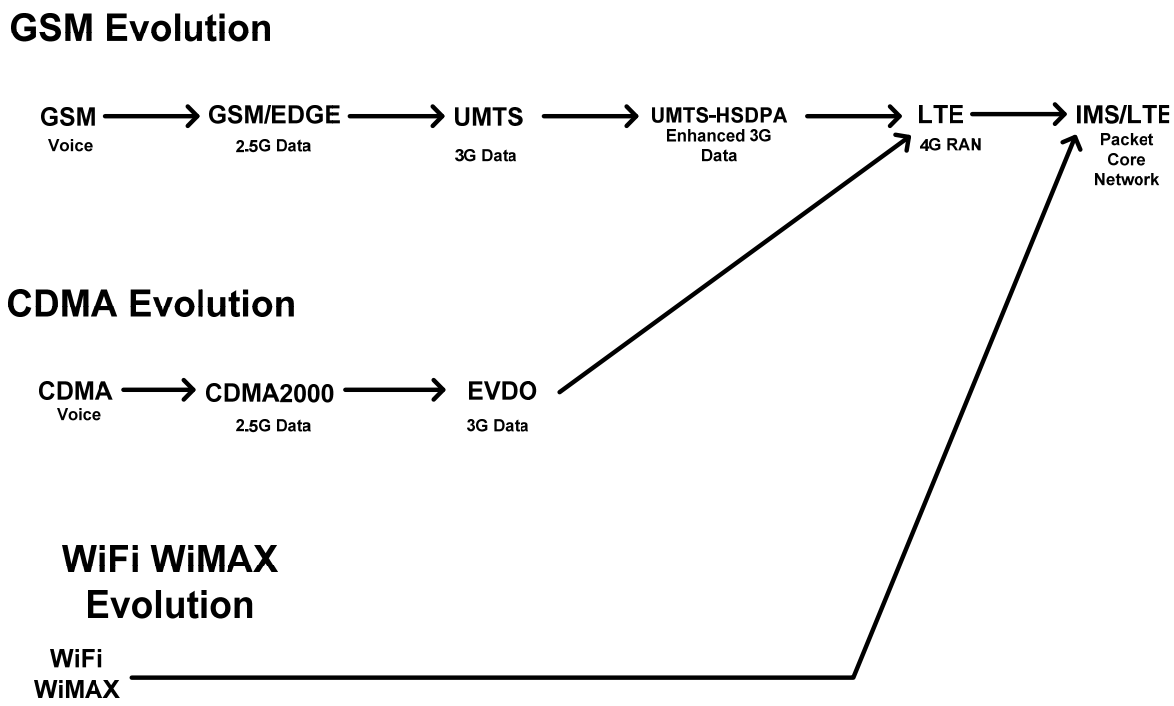


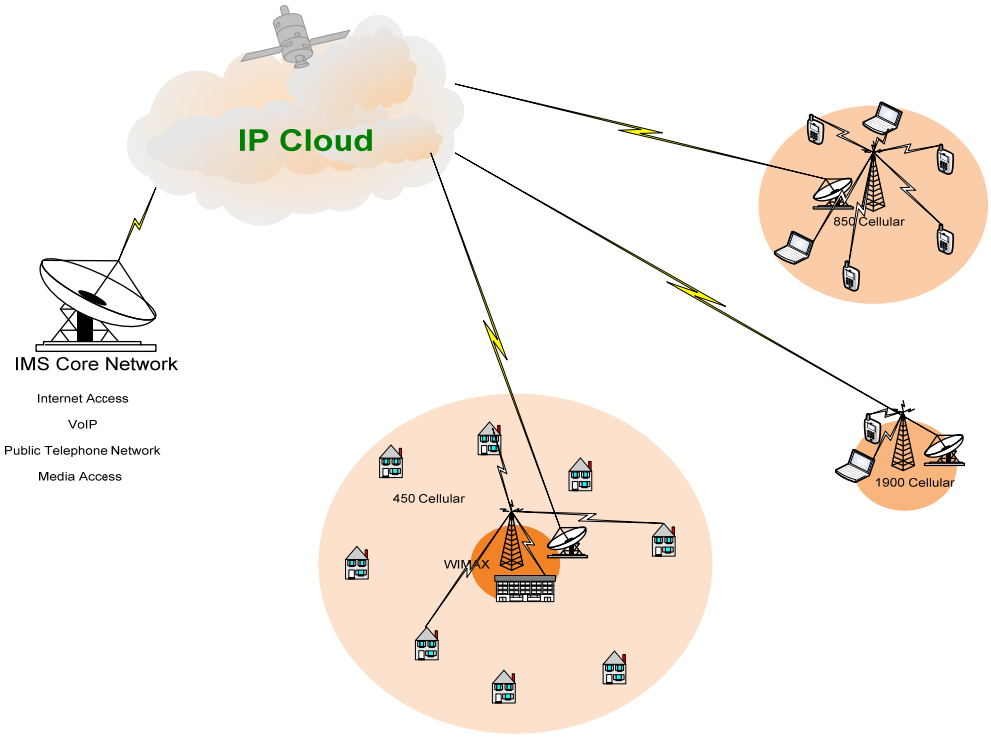
This document focuses on the GSM migration as this is the dominant technology path and the commercial aspects are highly developed providing a wide range of services and value propositions. However it is important to note again that the solution presented here does not exclude the other wireless technologies, which are all supported.

3.6 Local Wireless Engineering

This document selects UMTS, which is the GSM path 3G technology as a baseline for discussion. This technology will provide mobility, range, penetration, and maximum adaptability to the traffic. Each base station will support 10 Mbps of data. Multiple base stations can operate from the same tower and the technology allows the coverage to be adjusted to the demand. Available in several bands, the 700 MHz band will support the largest coverage area, but handsets are not as readily available as for the 1700 MHz and 850 MHz bands which provide smaller coverage areas.

An initial cell provides universal coverage. Traffic growth in the initial coverage area can be supported with coincident high density cells that are created using antenna alignment and the basic cell breathing characteristics of the air channel. In addition higher frequency cells and alternate technologies can be overlaid on a case-by-case basis. WiMAX or point-to-point microwave technologies can be used to extend the network establishing additional local cells as needed.

The system concept is shown below.



The engineering of the local network will be driven by the detail of the local requirement. The basic concept is to initiate coverage with a single UMTS Base Station site to provide coverage to the max number of users. As the served area matures the local network can be adapted to the traffic requirements.

3.7 UMTS Technology

Universal Mobile Telecommunications System (UMTS) utilizes a Wideband CDMA (WCDMA) air interface to provide up to 10 Mbps of data in each cell. It is available in the 700 MHz, 850 MHz, 1700 MHz, 1900 MHz, and 2100 MHz frequency bands. UMTS is part of the GSM evolution and will be followed by LTE. It is a broadband packet access network. It supports mobility and is fast becoming the standard for most cellular data services. UMTS supported by the hosted core will support home subscribers as well as roamers in a well established commercial environment.

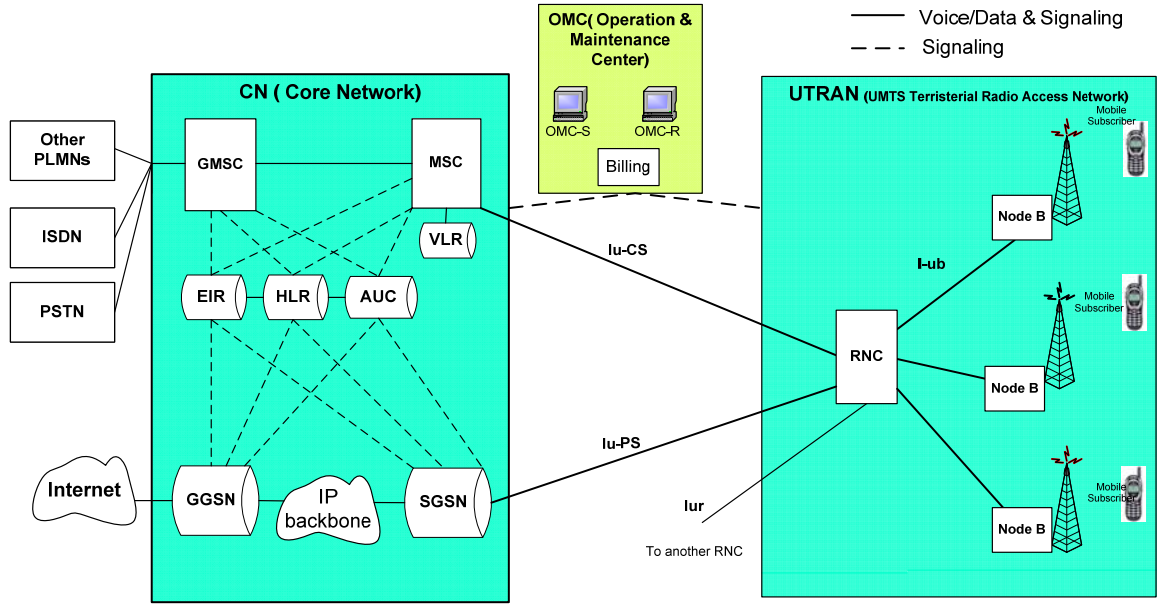
UMTS is a WCDMA technology. As such it will trade range for throughput ("cell breathing"). This characteristic allows for great flexibility in network engineering. A single cell can be deployed to cover maximum range when traffic loads are low. As the customer base grows and the capacity gets challenged the range of the cell will decrease. Overlaying a second cell will restore range until capacity is again challenged. Using antenna alignment and prioritization will allow the network engineer to create higher levels of service in designated areas.

The core network will also support the overlay of WIMAX, CDMA, and MVDDS technologies. It is noted CDMA 450, due to its lower operational frequency, can provide for extended cell sizes, and can be supported from the core network. CDMA 450 handsets are not as widely available as GSM and UMTS handsets, but the technology can be very useful in specific cases.

3.8 UMTS Architecture

The UMTS base station (eNodeB) is supported directly by the Radio Network Controller (RNC) which is supported by the hosted core. For most rural deployments the RNC would be part of the core network and collocated there.

For data services, the core network server (GGSN/SGSN) provides direct access to the Internet and interacts with additional core network elements to support authentication, billing, performance monitoring, and other core network functions. Subscriber services are provided through fixed and mobile terminals using a SIM card for customer identity.



3.9 Terminals

There exists a large selection of mobile terminals (i.e., handsets) for UMTS service. In addition fixed terminals can utilize external high gain antennas to extend the range of UMTS service, as well as provide typical SOHO (small office/home office) features as shown below.

3.10 Overlay Technologies

The GSM technologies can be over laid with other wireless technologies to extend the range of the offering or extend the bandwidth available. Two such technologies, WiMAX and MVDDS, are discussed below.

3.10.1 WIMAX Technology

WiMAX provides for local extension of the IP cloud. With the support of the core it can support broadband services. WiMAX (Worldwide Interoperability for Microwave Access) is a growing family of standardized technologies for broadband wireless communications. WiMAX provides the ability to transfer high-speed data efficiently over long ranges and to support digital voice, data, and video services in challenging environments.

There are two technology paths for WiMAX - one for fixed broadband access and one for mobile broadband access. These are separately defined by the Wireless Metropolitan Area Network (WMAN) working group of the Institute of Electrical and Electronics Engineers (IEEE) in publications 802.16d and 802.16e, respectively.

Fixed WiMAX supports stationary terminals which can include external antennas to provide greater range and coverage of a broadband rural solution including point-to-point applications (i.e. backhaul) and point-to-multipoint applications (end-user IP service). Mobile WiMAX targets mobile users. In this document we focus on the characteristics of fixed WiMAX which make it an ideal extension to the IP cloud. The standard mobile systems such as UMTS will support the mobile applications. Direct IP services to a WiMAX CPE at a user facility are supported by the IMS component of the GSI core.

Typical CPE for WiMAX consists of a USB adapter for short range (up to 900 Meters) and desktop products employing external antennas for long range. With an outdoor external antenna, a long range product could have a range of 6 miles or more.

USB WiMAX Adapter

Long Range WiMAX CPE

3.10.2 MVDDS Technology

To significantly expand the data rate of broadband services in rural areas will require the use of additional spectrum. With the need for very high connection speeds predominantly in the downlink, an MVDDS overlay can be offered to provide the solution. MVDDS spectrum offers a potential solution for provisioning very high bandwidth downstream service used in conjunction with the GSM/UMTS solution.

MVDDS stands for Multipoint Video and Data Distribution Service and consists of one-way point-to-point or point-to-multipoint licensed spectrum in the 12.2 to 12.7 GHz band. The 500 MHz of available bandwidth makes this licensed spectrum ideal for providing very high bandwidth downstream data services. There are 192 licenses owned nationwide on the basis of Designated Market Areas (DMA's) and these licenses may be leased and partitioned at a county boundary level.

Because of the wide bandwidth available MVDDS spectrum used alone can support most high value broadcast applications such as HD video. In combination with UMTS services, extremely high bandwidth data connections are possible. Polarization re-use allows for the reuse of most of the 500 MHz bandwidth further increasing the number of services that can be deployed. In addition MVDDS can be used in conjunction with WiMAX to create extremely high bandwidth asymmetric extensions to the network.

The MVDDS CPE equipment consists of a rooftop mounted dish, very similar to existing satellite DTH service and a tuner and router to select and process the incoming and outgoing data streams.

The effective use of the MVDDS spectrum requires specialized network planning expertise due to the FCC requirements for notification to other co-primary users of the band. GSI has access to experienced MVDDS network planning resources to ensure accurate network planning and a long history in the satellite space of operating in frequencies that have co-primary users.

4.0 CONCLUSION

This paper has shown the technology and services already exist for providing cost effective broadband access to un-served or underserved rural communities. The technologies and network architecture presented provide a universal solution to serve these areas immediately and at costs that are both acceptable and essentially independent of geographic and demographic scenario.

The solution combines the ability of fixed satellite systems to provide bandwidth at fixed costs to any location, with the concepts from the progression of Next Generation Networks (NGN) standards which make it feasible to have a universal core network which will support all wireless technologies.

The transport element is an IP "cloud" that has at its foundation a fixed satellite service which provides the ability to reach any un-served population quickly and at a fixed cost. By originating the satellite service from a Tier 1 node on the public network the cloud can also incorporate other available transport technologies that can support IP traffic.

A multi-standard core network is collocated at the Tier1 node that can support the current three main standards for wireless Services GSM/UMTS, CDMA, and WiMAX. This core network has been designed such that it can support the LTE and IMS standards mature as they mature. The result is a core that remains compatible with the evolving standards and is independent of the wireless system served.

GSM/UMTS service is focused upon because of its popularity. However this does not preclude the use of other standards (i.e., CDMA, WiMAX) as it is understood that these standards (e.g., CDMA 450) will still be well suited for certain deployments for many years to come.

A representative cost model is provided showing that the service can be offered at competitive costs today, and that this cost will only decrease as next generation backhaul technologies (e.g., spot beam satellites) are commissioned.

5.0 GLOSSARY

2G / 2.5G	2nd Generation – terms used to describe the second generation of mobile phone services where data services were introduced. 2.5G represents enhanced data services (such as GPRS and EDGE) over the original 2G technology.
3G / 3.5G	3rd Generation – term used to describe the current generation of mobile phone data services. UMTS and EVDO are considered 3G services. 3.5G (or 3G+) represents higher speed data services over the original 3G services.
4G	4th Generation - term used to describe the next generation of mobile phone data services offering significantly higher data speeds than current 3G services.
CDMA	Code Division Multiple Access – the term commonly used to describe a competing mobile phone standard to GSM that is widely deployed in the USA and some other countries.
CDMA2000	The first evolution of the CDMA standard offering data services. CDMA 2000 is also know as 1x or 1xRTT (1 times Radio Transmission Technology), and is typically considered a 2.5G service.
COFDM	Coded Orthogonal Frequency Division Multiplexing – a modulation method making use of frequency division multiplexing concepts. COFDM is a modulation method used for some WiMAX and LTE implementations.
DAMA	Demand Assigned Multiple Access – an access technique to a telecommunications media that assigns bandwidth dynamically on an as-needed basis
EDGE	Enhanced Data rates for GSM Evolution – a 2.5G data service offering for GSM networks offering moderate speeds (i.e., less than 3G/UMTS but more than GPRS).
EVDO	Evolution-Data Optimized or Evolution-Data Only – the telecommunications standard used to describe 3G data services in a CDMA network.
GPRS	Generalized Packet Radio Service – the oldest, and lowest speed, packet oriented mobile data service for GSM networks.

GSM	Global System for Mobile Communications – the most popular standard for mobile phones in the world.
HSDPA	High Speed Downlink Packet Access – an enhanced data service which allows UMTS networks to have higher data transfer speeds and capacity.
HSP	Hosted Services Platform – the core network deployed at Globecomm's facility that supports GSM/UMTS, CDMA, and WiMAX communications services.
IMS	IP Multimedia Subsystem – a framework for delivering IP-based telecommunications services. IMS can be viewed as an architecture enabling the convergence of wireless and wireline services on to a common core network.
IP	Internet Protocol
LTE	Long Term Evolution – a fourth generation ("4G") standard for radio network access technologies further increasing data speeds available in a cellular network. LTE can be viewed as the successor to UMTS.
MVDDS	Multichannel Video and Data Distribution Service – a terrestrial based wireless transmission method operating in the 12.2-12.7 GHz band that can be used for one-way point-to-point or point-to-multipoint data transmission.
NGN	Next Generation Network – the term used to describe the evolution of telecom networks where one packet based network transports all information and services (e.g., voice, data, video).
QOS	Quality of Service – a measure of the reliability of a telecommunications service. IP networks supporting multiple services (e.g., voice, video, data) require special attention to QOS in order to provide an acceptable grade of service for all the users and services.
R&D	Research and Development
RAN	Radio Access Network – the radio elements (i.e., the base stations and base station controller) of a cellular network.
SCPC	Single Channel Per Carrier – term used to describe a dedicated satellite link – i.e., the bandwidth is assigned to the channel on a full-time basis.
SIM	Subscriber Identity Module – the card in a GSM phone that contains the subscriber's information (e.g., his telephone number / account number).

UMTS	Universal Mobile Telephone Service – a third generation (“3G”) mobile phone standard supporting the evolution of GSM service that provides higher data speeds than the previous standards of GPRS and EDGE. Also known as WCDMA.
VSAT	Very Small Aperture Terminal – term typically used to describe a small satellite earth terminal.
WCDMA	Wideband Code Division Multiple Access – a synonym for UMTS.
WiMAX	Worldwide Interoperability for Microwave Access – a family of standards for wireless broadband data including both fixed and mobile services.